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TESTING MESSAGE DIFFUSION IN FOUR COMMUNITIES: SOME FACTORS IN THE USE OF AIRBORNE LEAFLETS AS A COMMUNICATION MEDIUM

MELVIN L. DE FLEUR AND EDITH DYER RAINBOTH

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"PROJECT REVERE" is a long-range research program being carried out by the Washington Public Opinion Laboratory of the University of Washington. The project, under contract to the Air University of the Human Resources Research Institute of the United States Air Force, is designed to gain information about the more effective use of airborne leaflets as a communication medium. Such leaflets have been used in psychological warfare to diffuse messages to populations where the usual media of communication are not available.

In the present study, the *community* is defined as the unit of observation, or experimental "subject." The problem of the investigation is to determine the extent of community or group response when both *the stimulus intensity* (ratio of leaflets per person) and the *number of repetitions* (defined as the number of consecutive daily leaflet drops), are varied. The *response* under study is simply the proportion of the population that learns the message on the leaflets.

Stimulus intensity can be varied by increasing or decreasing the number of leaflets per person used on a given community, and number of repetitions can be controlled by dropping the leaflets on consecutive days for as many times as desired. And, if the response to the leaflets (as defined above) can be viewed as an index of the impact or effect of the drop, stimulus intensity and number of repetitions can be systematically varied and the communities can be examined to determine the relationships between the experimental variables and the effect achieved.

To determine these relationships, two rather simple working hypotheses are considered: (a) a "high" ratio of leaflets per person (16/1) will produce a significantly greater response than a low ratio (4/1), and (b) several consecutive daily leaflet drops will produce a significantly greater response in a community than a single drop, where the total number of leaflets used is the same in both cases.

Such simple hypotheses are capable of acceptance or rejection on a statistical basis, and furnish a framework for the study. Two concepts[1] from elementary psychology suggested analogically that the relationships under study might be described by simple curves. These psychological concepts were used only as sources of hypotheses, and are not intended as explanatory principles.

In order adequately to test the hypotheses it was necessary to set up the experimental design to minimize the effect of other variables which can influence community response to a leaflet message. For this reason four experimental towns, and one pilot study town, were selected. All are close to 1000 in population and none are satellites of a metropolis; all are relatively distant from large neighboring towns. The communities are all geographically quite similar, in that they are flat and not bisected by major barriers such as rivers, and the like. The populations of the communities are engaged in similar occupational pursuits—each of the towns is in an agricultural and lumbering center.

A suitable leaflet containing a Civil Defense message was designed with the cooperation of the State Civil Defense Director, who allowed the experiment to be carried out as a Civil Defense test of emergency communication. To measure the response, a questionnaire was designed and the entire procedure was pretested in a pilot study on a community similar to the four experimen-

[1] The well-known Weber-Fechner function and the simple decreasing-increment learning curve, where learning of material increases at a decreasing rate over number of repetitions, were sources of the hypotheses for the possible shape of the stimulus-intensity-vs.-response curve and the repetitions-vs.-response curve in the present case.

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tal towns. From the data obtained in this pretest, improvements were made in wording of both the leaflet and the questionnaire. The revised leaflet contained the following message:

> One visit from an ENEMY BOMBER could send evacuees pouring into your town. . . . If such a disaster occurred . . .
>
> *How many refugees could you take into your home?*
>
> A Civil Defense representative will call to get your answer. Be sure to talk it over with your family and friends so every one in this community will have heard about this.
>
> A friendly airplane dropped this leaflet just as it might do in an emergency when the usual means of communication are not available.
>
> (signed) D. E. Barby
> State Civil Defense
> Director

This leaflet, a 5 x 8 inch card, is printed on both sides in black letters on yellow stock, and, at the top of the page, has a drawing of a bomber from which several bombs had been released. The words "Enemy Bomber" appear in large bold type, and the main idea of the message, "The number of refugees that could be taken into a home," is emphasized by bold print.

After the leaflet and questionnaire had been suitably improved the major experiment with the four previously selected towns was carried out. The treatments were assigned randomly to the four subjects as follows:

I. Repeated Drop:
   a. Town A (low leaflet ratio)
   b. Town B (high leaflet ratio)

II. Non-Repeated Drop:
   a. Town C (low leaflet ratio)
   b. Town D (high leaflet ratio)

The repeated dropping of leaflets consisted of three consecutive daily leaflet drops. The original design of the experiment called for the high leaflet ratio to consist of 16 leaflets per person, and the low ratio to be 4 leaflets per person. These were the ratios actually dropped on the single, or non-repeated towns. Inclement weather interfered with a fourth drop planned for the repeat-drop towns and as a result the high ratio for the repeat-drop towns was 12 leaflets per person, while the low ratio was 3 leaflets per person.

Five days after the first leaflets were dropped, teams of interviewers polled the four communities to measure the response. One interview was made at each household in the town, and an effort was made to interview the head of each family. A total of 1118 interviews was completed. These were distributed among the four communities as follows: Town A, 254; Town B, 343; Town C, 269; Town D, 251. The groups interviewed were nearly two-thirds housewives in all of the four cases. While such a sampling technique does not yield a representative sample for any given town, it is adequate for the comparative type of analysis used in the investigation.

The "response" of the community was measured in several ways with the use of the pretested questionnaire. A number of specific types of behavior toward the leaflets on the part of the respondents were identified by the questions listed below, and the proportions of persons involved in each type were determined for each community. The questions used were:

1. What do you remember about the message on the leaflets?
2. How did you *first* learn what the message was?
3. Did you actually read one of the leaflets?
4. Did you have one of them in your house?

The response of most interest to the leaflet dropper is that of "knowing the message" on the leaflets. From the pilot study data it was possible to select a set of four "earmarks," or criteria of knowing the message. The answers to the first question, above, were recorded verbatim by the interviewers and later examined by a set of judges; if at least one of the "earmarks," or criteria of knowing the message, appeared in the recorded reply to the first question, the respondent was judged to be a knower of the message. The second item was treated in somewhat the same manner. A set of judges examined the verbatim replies of the respondents and from a previously determined code system classified them according to whether they had: (1) picked up a leaflet, (2) learned the message by hearing it from another person, or (3) learned the message by reading the leaflet. The third question allowed an identification of those

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respondents who had read a leaflet at any time, and the remaining question identified those who had a leaflet in their home. In addition to the above items a *time* question was asked that requested from each respondent the day and hour that he had first learned the message. Certain Civil Defense information was also gathered.

The results gave sufficient data for testing the two simple hypotheses stated previously. The high ratios of leaflets per person produced a greater response when dropped on the communities than did the low ratios; in the low-ratio communities an average of 35 per cent of the respondents knew the message and an average of 64 per cent of those interviewed in the high-ratio towns knew the message. This difference between response percentages is significant above the one per cent level of confidence.

When comparing the communities on the basis of number of repetitions of the leaflet drops, the average proportion of knowers for the single-drop towns was 46 per cent, while the average for the repeat-drop towns was 55 per cent. This indicates that three repetitions of the stimulus increased the response significantly (above the one per cent level of confidence), even though *25 per cent fewer leaflets were used in the repeat-drop towns.*

In addition, an examination was made of the cumulative increases in the proportion of persons who learned the message during the six experimental days. In the single-drop towns, over 93 per cent of the persons who eventually knew the message *learned it on the first day,* and increases in the number of knowers after the first day were very small. In the repeat-drop towns, where 25 per cent fewer leaflets were used, the effect of repetition can be seen by the gradual rise in the response curve. An average of 55 per cent of the respondents eventually knew the message in the repeat-drop towns, but on the first day just over half learned the message. The remaining days show a more gradual rise of the curve until it crosses and rises above the cumulative response curve of the single-drop towns.

In general, the results seem to suggest that every additional repetition increased the learning that took place, but with smaller and smaller increments. A great deal of further experimentation would be needed to verify this hypothesis, and it is merely stated here as the most likely type of relationship that would be found in such a situation.

Cumulative Response Curves

A COMPARISON OF THE DAILY INCREASES IN RESPONSE FOR REPEATED AND SINGLE DROP COMMUNITIES

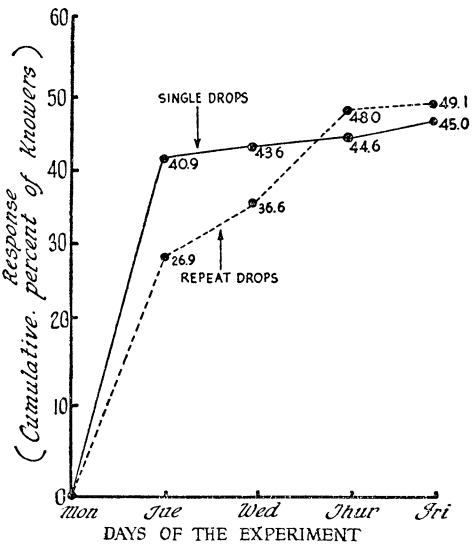

FIGURE 1

From the responses to the question, "When did you *first* learn the message on the leaflets?", it was possible to plot the proportion of the respondents who learned the message on Monday, the first day of the experiment. Since there was but one leaflet drop made in each community on this day, these responses are not influenced by the repetition variable. The repeat-drop communities had received a ratio of one leaflet per person and four leaflets per person respectively on the first day, while the single-drop towns had received four leaflets per person and 16 leaflets per person, respectively. This allowed a response curve to be drawn for three values of the leaflet ratio. With a one-to-one ratio, 18 per cent of the respondents learned the message on the

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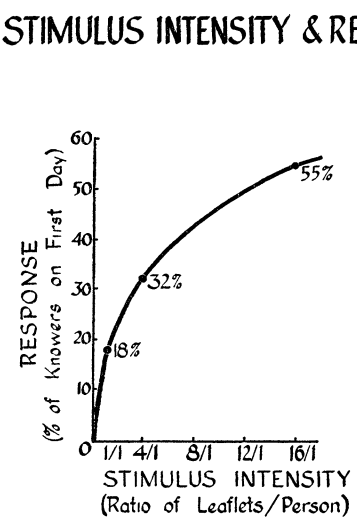

THE RELATIONSHIP BETWEEN THE NUMBER OF LEAFLETS-PER-PERSON AND THE RESPONSE ON THE FIRST DAY, ONLY

FIGURE 2

first day; with the four-to-one ratio, the average response about doubled to 32 per cent. Thus a fourfold increase in the intensity of the stimulus somewhat less than doubled the response. Then in the remaining community where a 16 to 1 ratio was used the response rose to 55 per cent; this again is somewhat less than double the previous value while the intensity of the stimulus increased fourfold again.

Of course a curve of only three points is inadequate for rigorous interpretation of any type of relationship, but the observed results suggest that a logarithmic increase in stimulus intensity was necessary to produce an arithmetic increase in effect (response of knowing the message). It is of interest to note that the shape of the curve describing this relationship is similar to that of the Weber-Fechner function of sensory psychology. The mechanisms behind the two relationships, however, are vastly different.

The remaining measurements of response, made by determining the proportions of persons involved in the related behavior, tend to confirm the simple hypotheses being tested, in that the high ratios gave consistently larger proportions of persons in the towns who had picked up a leaflet, read it, and had a leaflet in their home. This was also true of the triple-drop towns when compared to single-drop towns. In each case the triple-drop towns had larger proportions of persons picking up leaflets, reading them, and taking them home.

Table 1 shows the proportions of persons involved in five types of response to the leaflet stimulation. The table is simply a summary of responses on five indices of behavior, and is intended to illustrate the consistency of the rank order relationship of the behavior in all the treatments.

There was actually a negligible amount of purely oral message diffusion in the four communities. As this was also true of the pilot study town it becomes obvious that in order to increase the communication of a message of this type to such populations one must distribute the leaflets in such a manner that they will be available to every person. From the data on stimulus intensity and stimulus repetition it can be seen that to *maximize* the probability that every person in a community will be communicated to, it is necessary to use an intense stimulus (high leaflet ratio) and repeat the stimulation (make several consecutive drops).

TABLE 1. PER CENT* OF RESPONDENTS INVOLVED IN FIVE TYPES OF RESPONSE TO LEAFLETS

Responses	Low Leaflet Ratio		High Leaflet Ratio	
	Single-Drop Town	Triple-Drop Town	Single-Drop Town	Triple-Drop Town
1. Picked up a leaflet	18	19	27	50
2. Had a leaflet in home	21	28	47	54
3. Learned the message by reading the leaflet	24	33	54	58
4. Read leaflet at any time	27	37	59	62
5. Knew leaflet message	30	41	63	65

* Percentages based on the number of respondents in each of the four communities.

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